Exam.Code:0925
Sub. Code: 33591

2076
B. E. (Information Technology)
Seventh Semester
PCIT-701: Digital Signal Processing

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

Q.1a Test whether the following signal is periodic or not ,if periodic, find the fundamental period $\sin\sqrt{2}\,\pi\, t$.

b Give the relationship between DFT and z transform.

c State all properties of DFT .

d Obtain the mapping formula for the impulse invariant transformation.

e What are the applications of multi rate DSP? (5x2)

PART A

Q.2.a. State and explain the properties of z transform.

b. Determine the causal signal $x(n)$ having the Z-transform.

$H(z) = 1 \;/\{(1 + z^{-1})(1 - z^{-1})\}$ (5,5)

Q.3a. What are the applications of DSP?

b. Find out whether the $\mathbf{y(n) = 4n^2x(-n) + 4x(n^2)}$ system is

i. Static
ii. Linear
iii. Time invariant
iv. Causal
v. Stable (5,5)

Q.4a Find the circular convolution of $x_1(n)=\delta(n)+\delta(n-1)+\delta(n-2)$ and $x_2(n)=2\delta(n)-\delta(n-1)-4\delta(n-2)$

b Compute 8-point DFT of the sequence x(n)= {1,2,1,2,1,2,2,1} using radix-2 DIF-FFT algorithm. (5,5)

PART-B

Q.5 Obtain the parallel and cascade realization structures for the given signal

$y(n)=y(n-1) - 1/2y(n-2) + x(n) - x(n-1) + x(n-2)$. (10)

Q.6a Explain the Bilinear Transformation method of digital IIR filter design?

b. Design a digital IIR filter using this method, if the analog filter is specified by

$\mathbf{H_a(s) = (s+0.1)/(s+0.1)^2 + 9}$, $\omega_r = \pi/4$. How is it better than Impulse Invariance? (5,5)

Q.7 Describe the architecture and features of TMS320CXX family of processors with block diagram. (10)

x-x-x